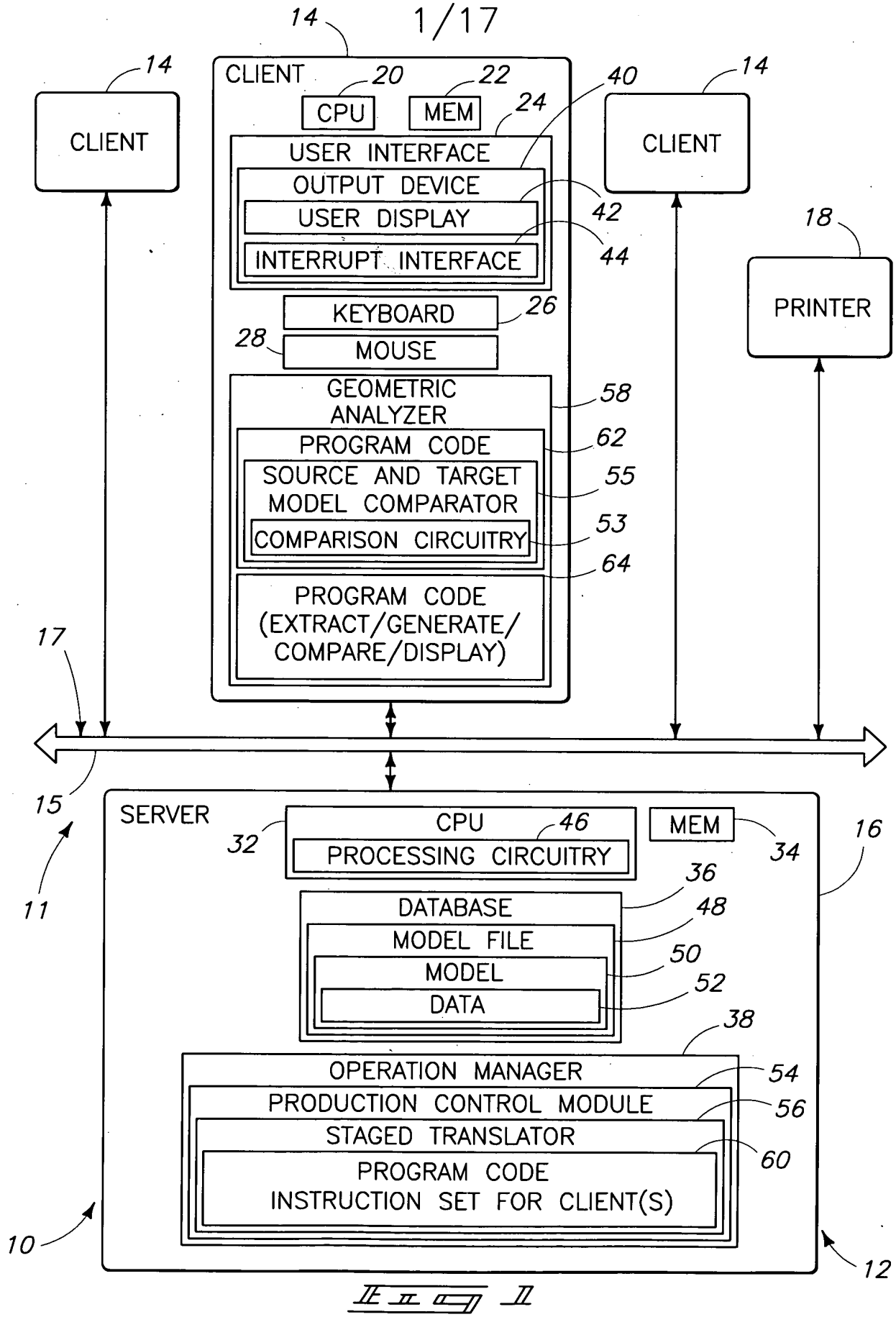

14
CLIENT
20
CPU
22
MEM
24
USER INTERFACE
40
OUTPUT DEVICE
42
USER DISPLAY
44
INTERRUPT INTERFACE
26
KEYBOARD
28
MOUSE
58
GEOMETRIC ANALYZER
62
PROGRAM CODE
55
SOURCE AND TARGET MODEL COMPARATOR
53
COMPARISON CIRCUITRY
64
PROGRAM CODE (EXTRACT/GENERATE/ COMPARE/DISPLAY)
14
CLIENT
14
CLIENT
18
PRINTER
17
15
11
SERVER
32
CPU
46
PROCESSING CIRCUITRY
MEM
34
16
36
DATABASE
48
MODEL FILE
50
MODEL
52
DATA
38
OPERATION MANAGER
54
PRODUCTION CONTROL MODULE
56
STAGED TRANSLATOR
60
PROGRAM CODE INSTRUCTION SET FOR CLIENT(S)
10
12

Fig. 1

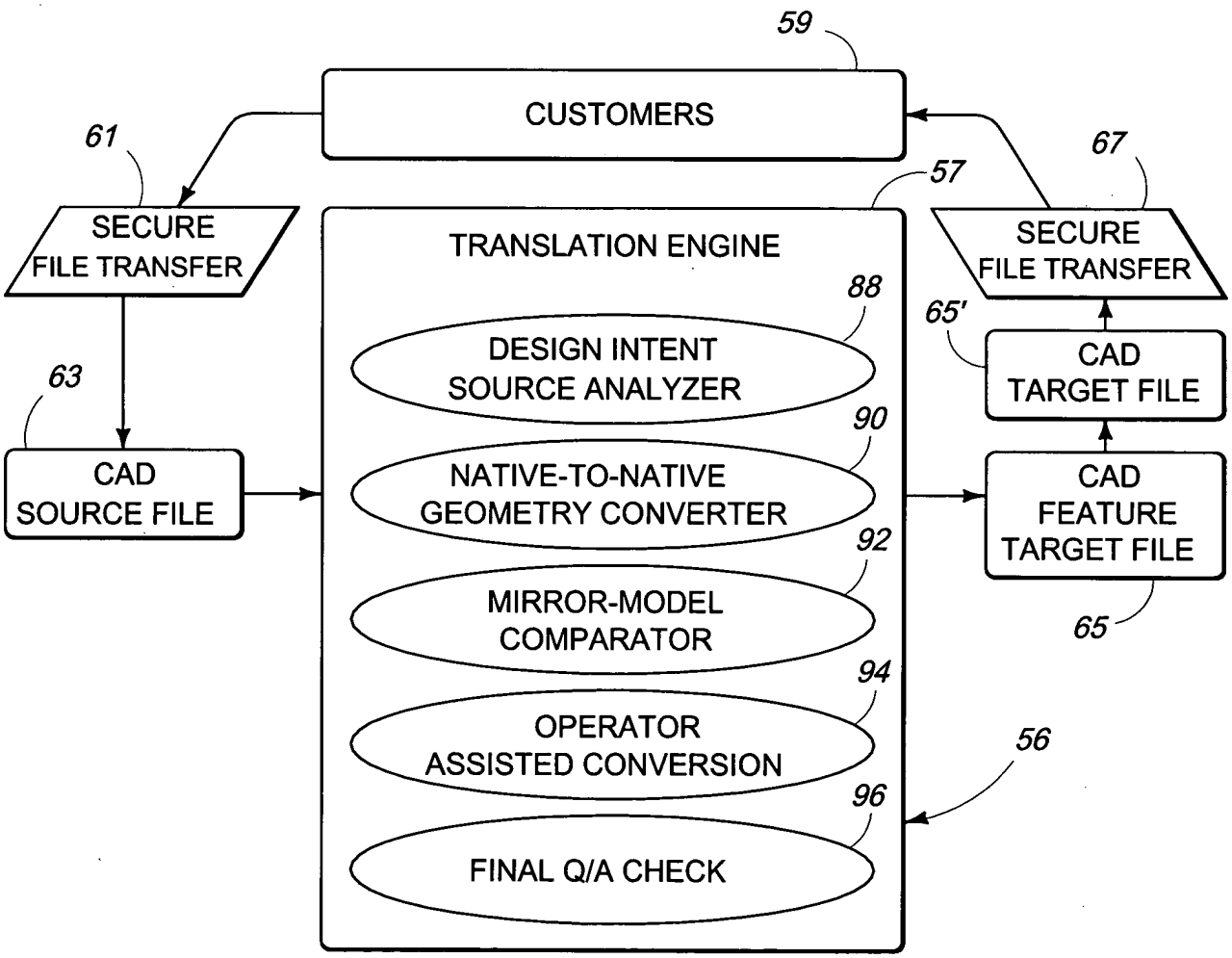

59
CUSTOMERS
61
SECURE
FILE TRANSFER
57
TRANSLATION ENGINE
88
DESIGN INTENT
SOURCE ANALYZER
90
NATIVE-TO-NATIVE
GEOMETRY CONVERTER
92
MIRROR-MODEL
COMPARATOR
94
OPERATOR
ASSISTED CONVERSION
96
FINAL Q/A CHECK
63
CAD
SOURCE FILE
67
SECURE
FILE TRANSFER
65'
CAD
TARGET FILE
CAD
FEATURE
TARGET FILE
65
56

Fig 2

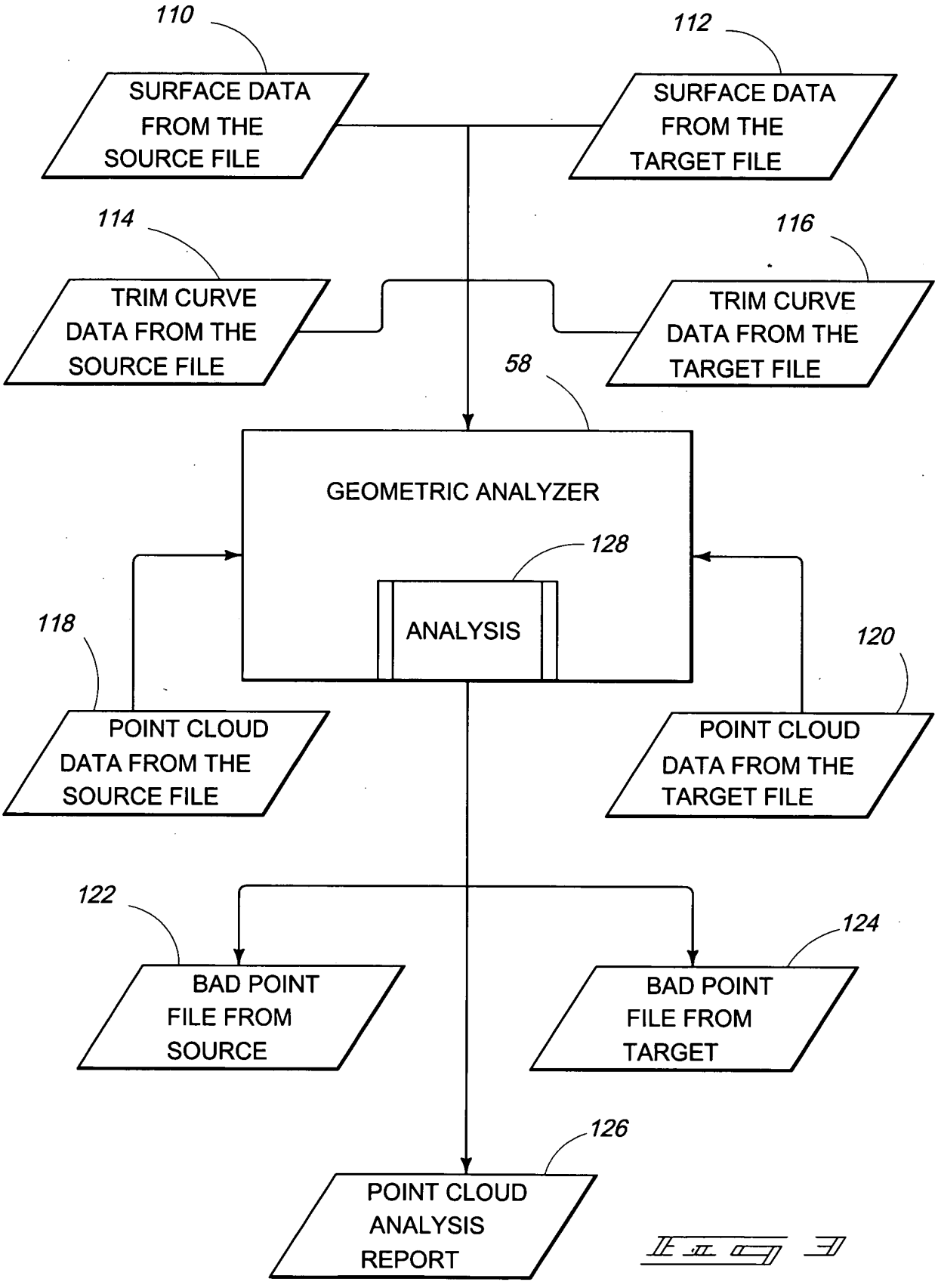

110
SURFACE DATA FROM THE SOURCE FILE
112
SURFACE DATA FROM THE TARGET FILE
114
TRIM CURVE DATA FROM THE SOURCE FILE
116
TRIM CURVE DATA FROM THE TARGET FILE
58
GEOMETRIC ANALYZER
128
ANALYSIS
118
POINT CLOUD DATA FROM THE SOURCE FILE
120
POINT CLOUD DATA FROM THE TARGET FILE
122
BAD POINT FILE FROM SOURCE
124
BAD POINT FILE FROM TARGET
126
POINT CLOUD ANALYSIS REPORT

Fig 3

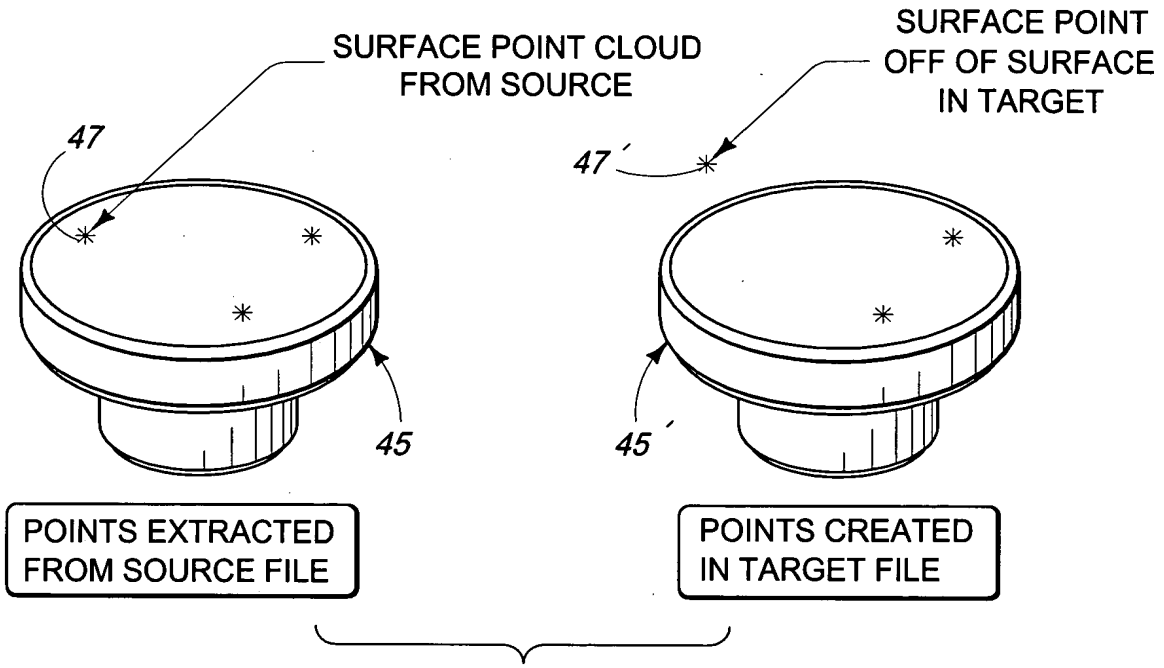

SURFACE POINT CLOUD
FROM SOURCE
SURFACE POINT
OFF OF SURFACE
IN TARGET
47
47'
45
45'
POINTS EXTRACTED
FROM SOURCE FILE
POINTS CREATED
IN TARGET FILE

Fig 4

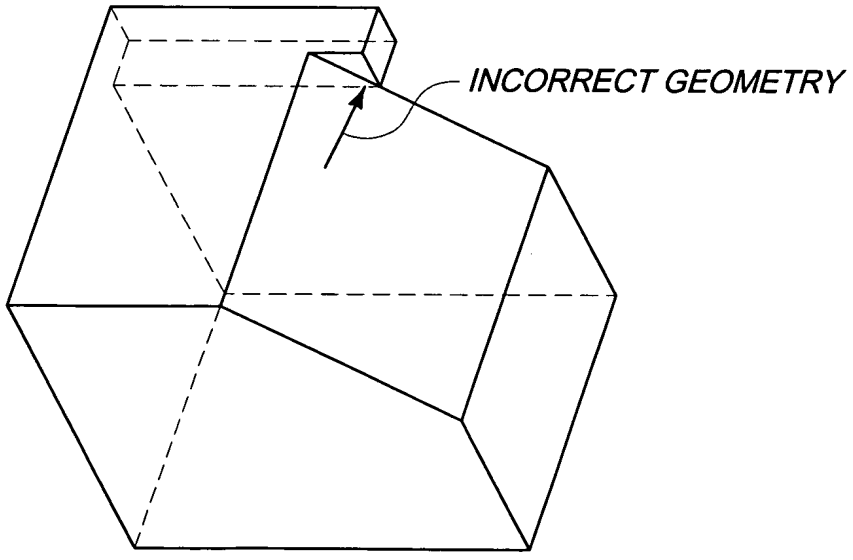

INCORRECT GEOMETRY

Fig 5

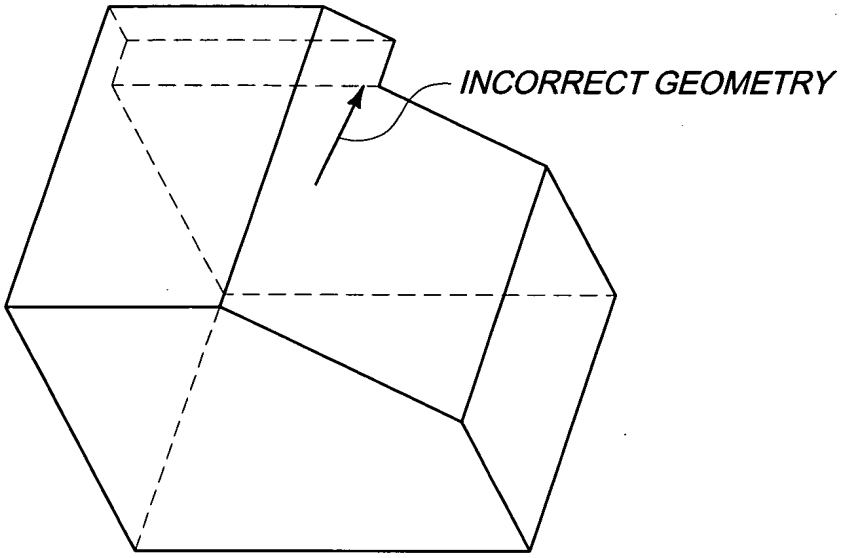


Fig 6

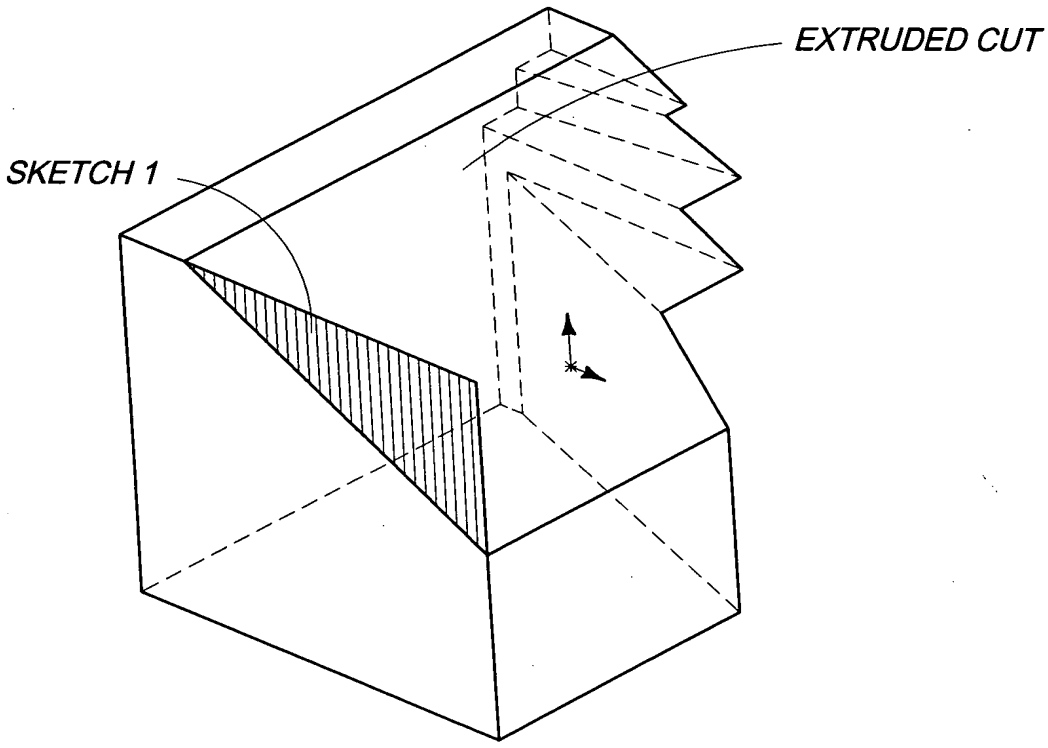


Fig 7

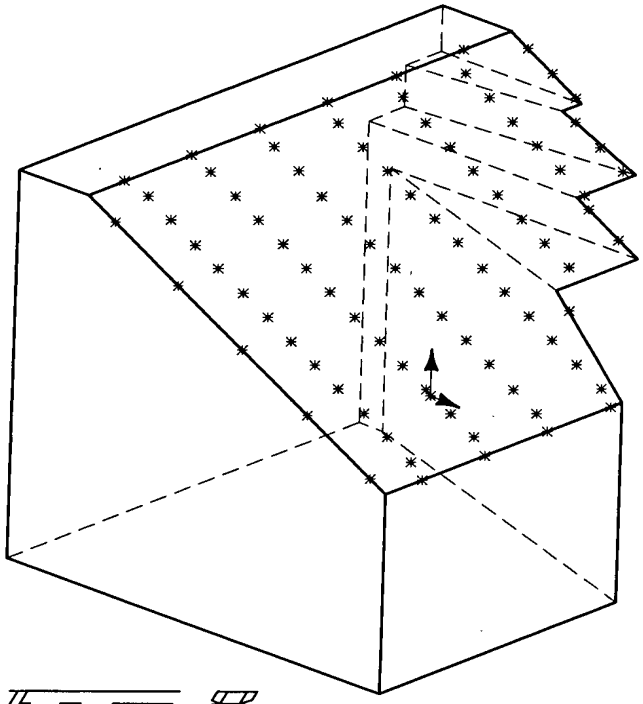


Fig 8

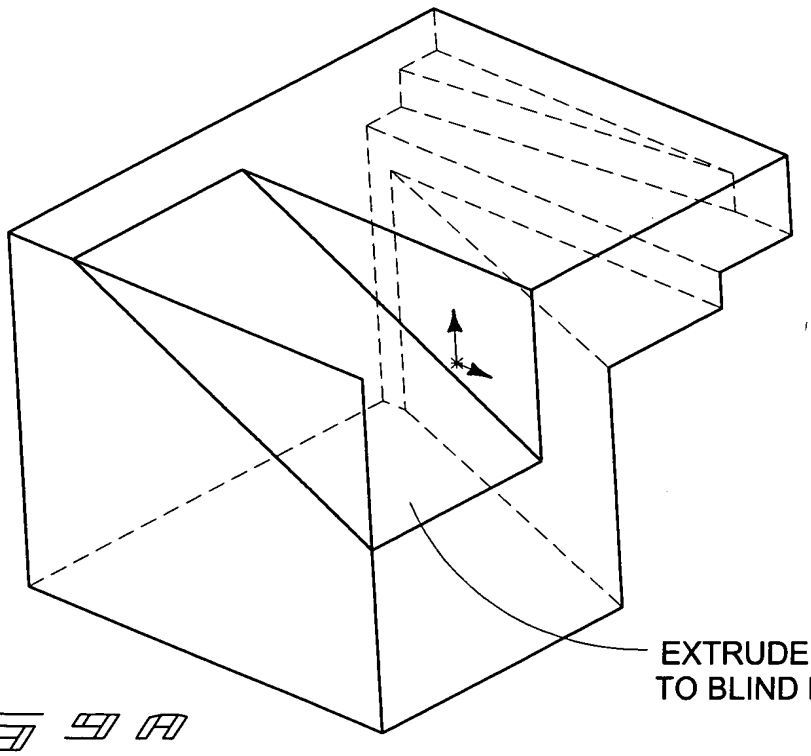


Fig 9A

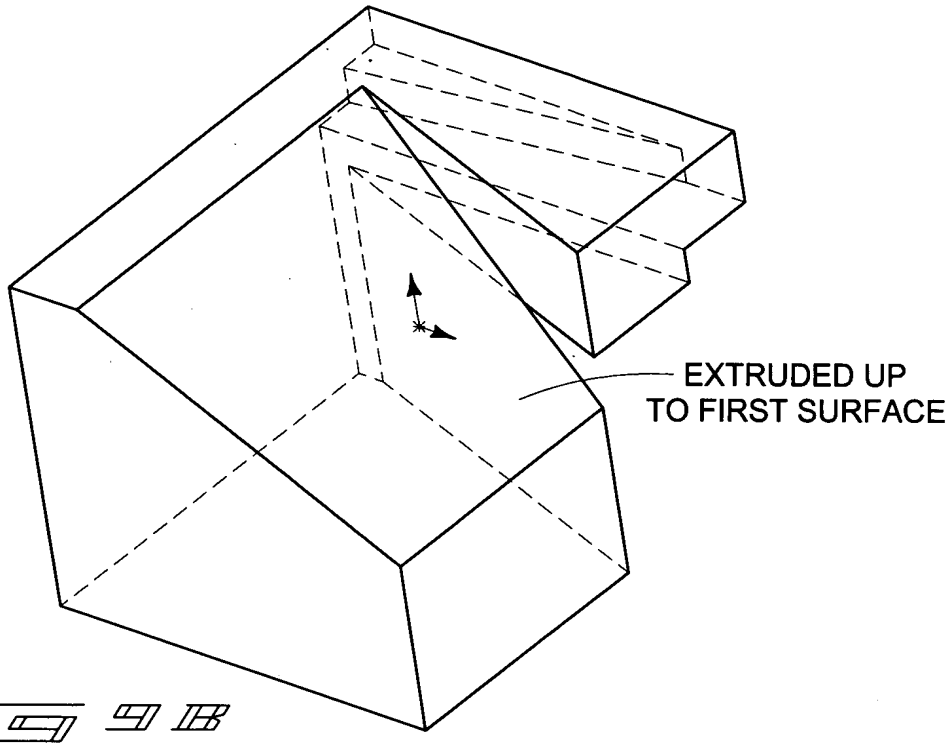

EXTRUDED UP
TO FIRST SURFACE

FIG 9B

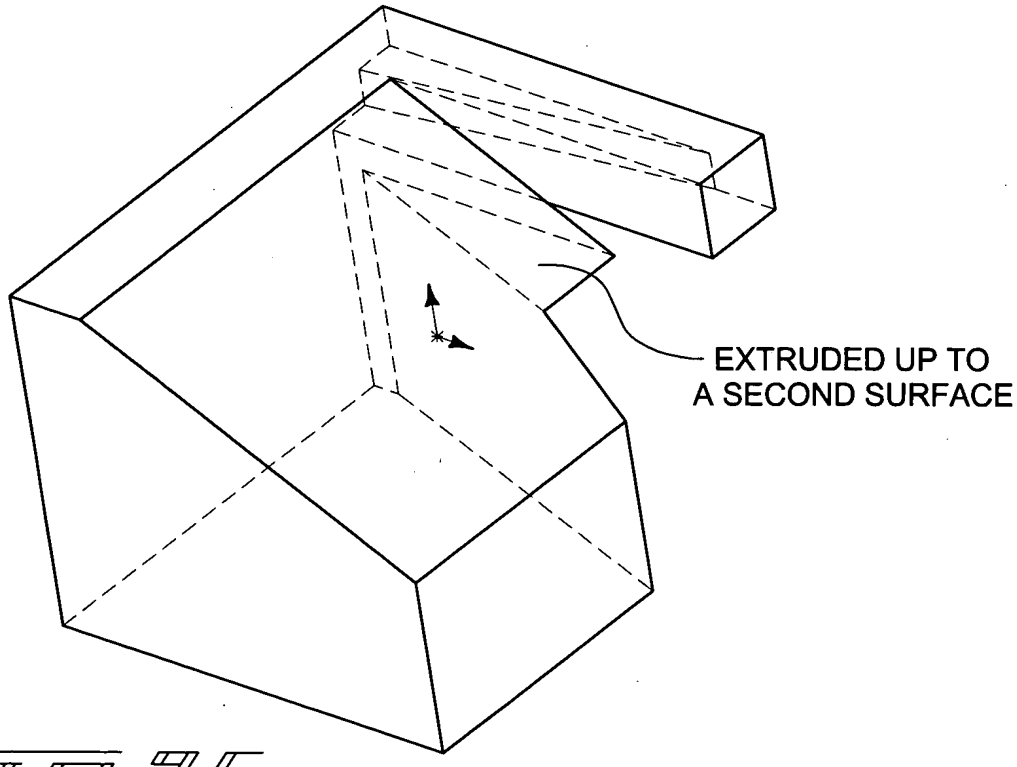

EXTRUDED UP TO
A SECOND SURFACE

FIG 9C

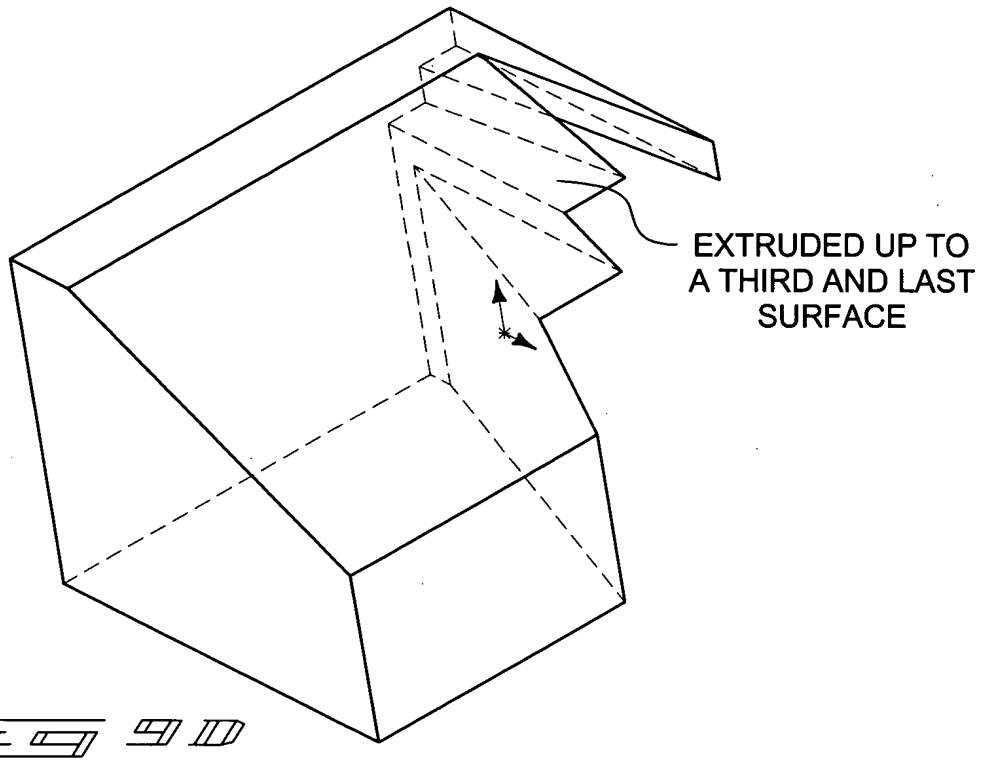


Fig 9D

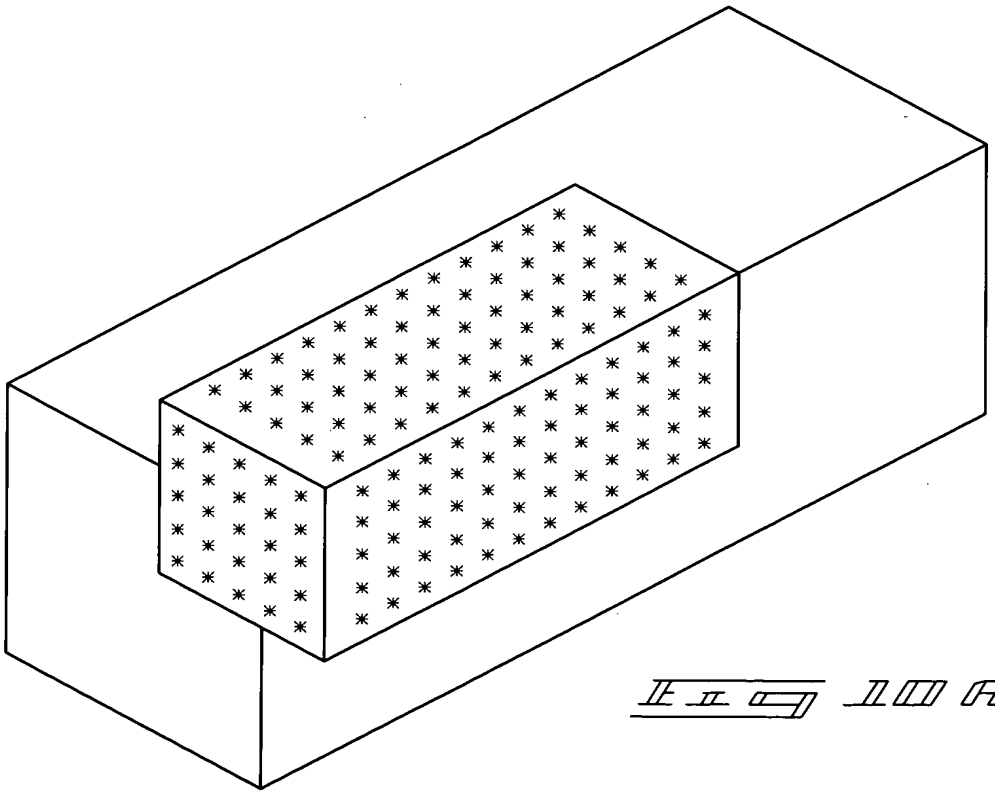
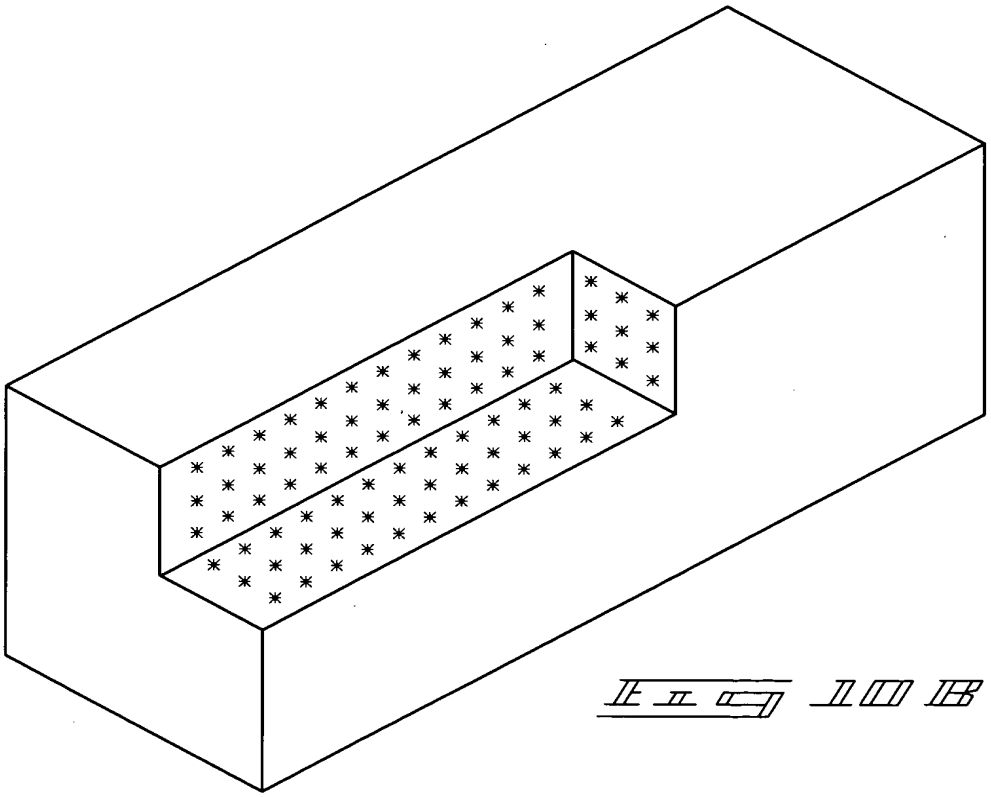


Fig 10A



도면 10B

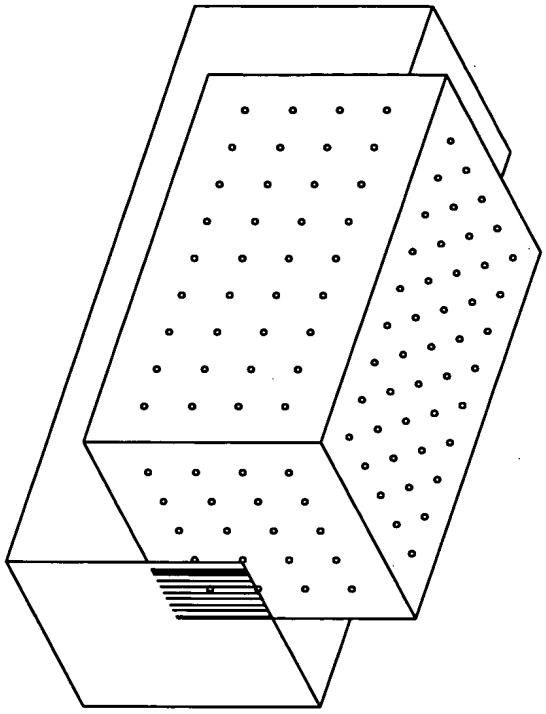


Fig 11A

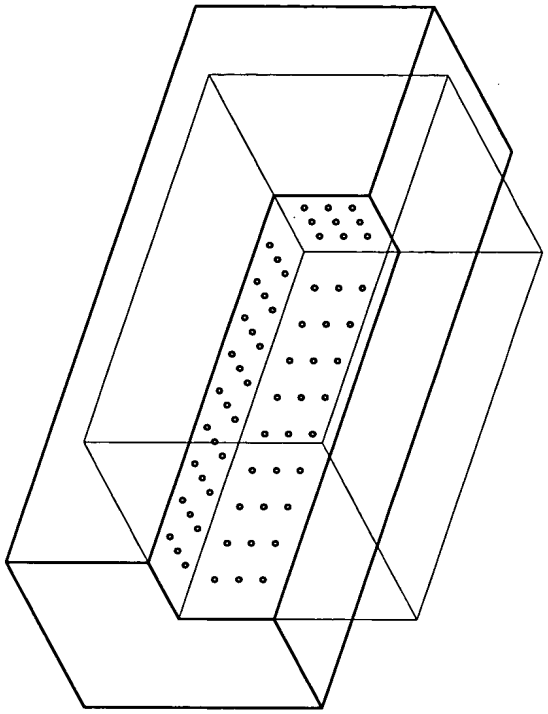


Fig 11B

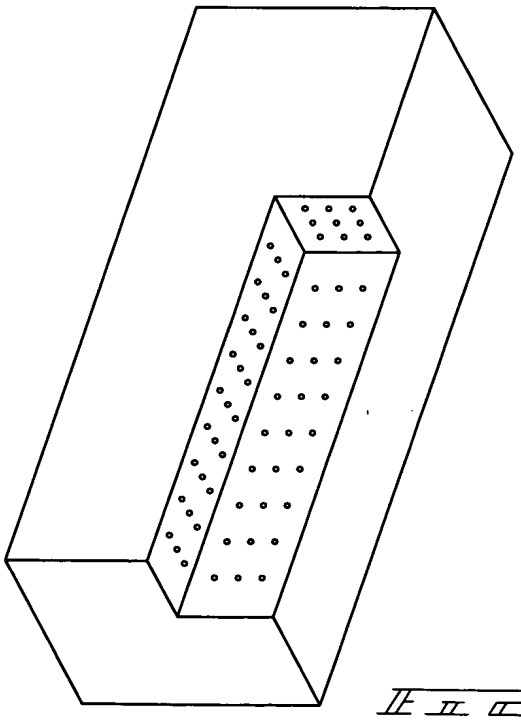


Fig 11C

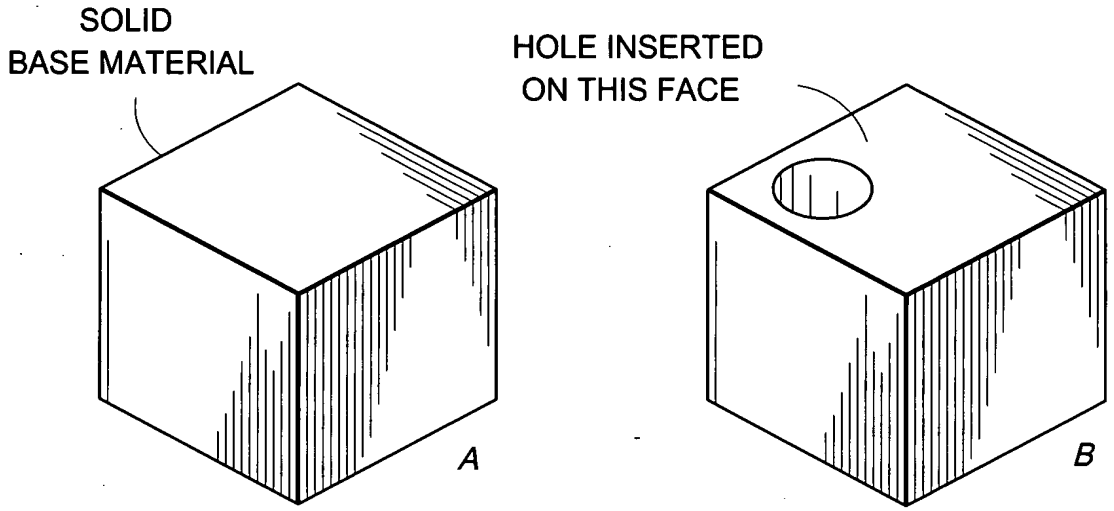
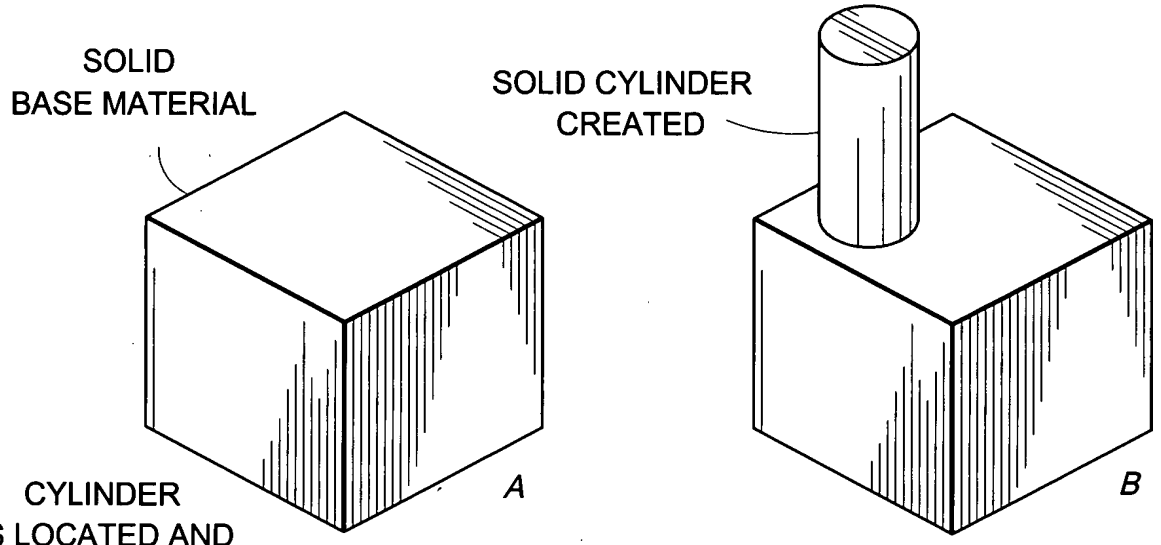

SOLID
BASE MATERIAL
HOLE INSERTED
ON THIS FACE
A
B

Fig 12


SOLID
BASE MATERIAL
SOLID CYLINDER
CREATED
A
B

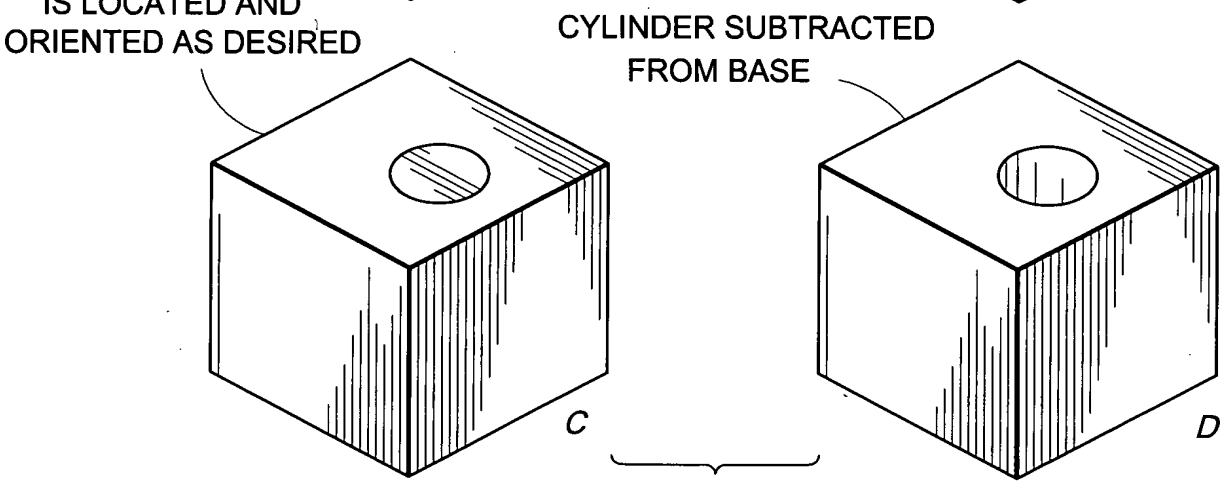

CYLINDER
IS LOCATED AND
ORIENTED AS DESIRED
CYLINDER SUBTRACTED
FROM BASE
C
D

Fig 13

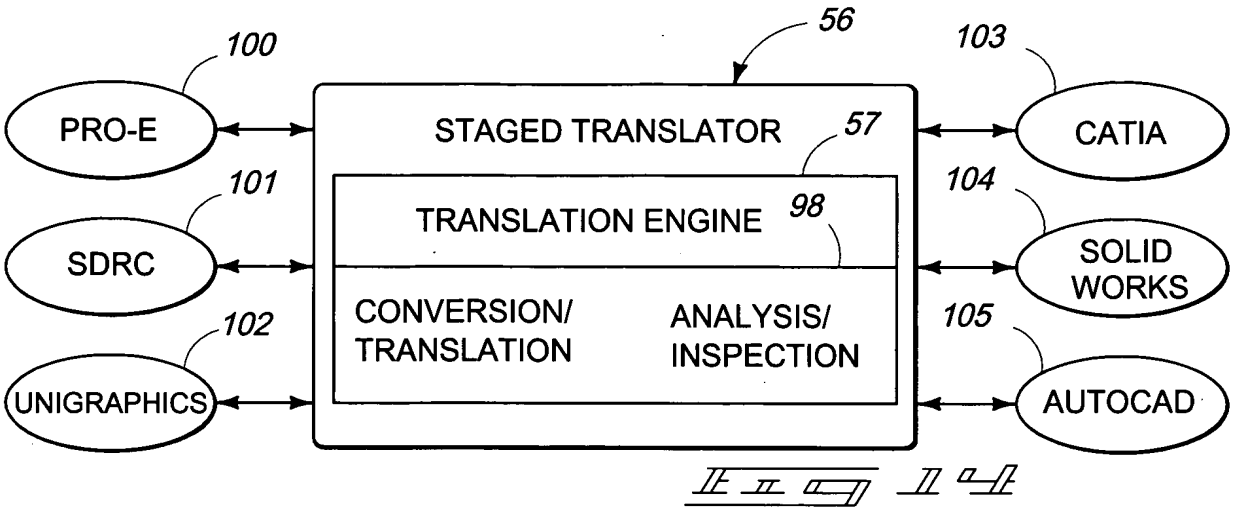


Fig 14

FEATURE BASED TREE

P_1
P_2
P_3
P_4
P_5
C_1
P_6
P_7
P_8
C_2

Fig 15

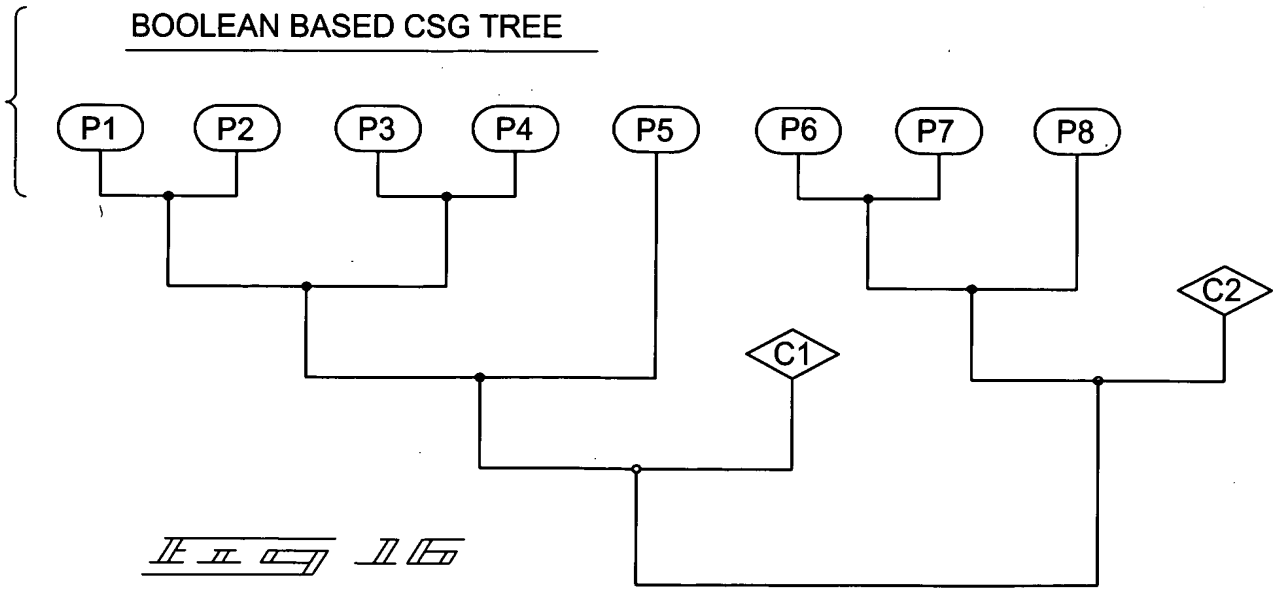


Fig 16

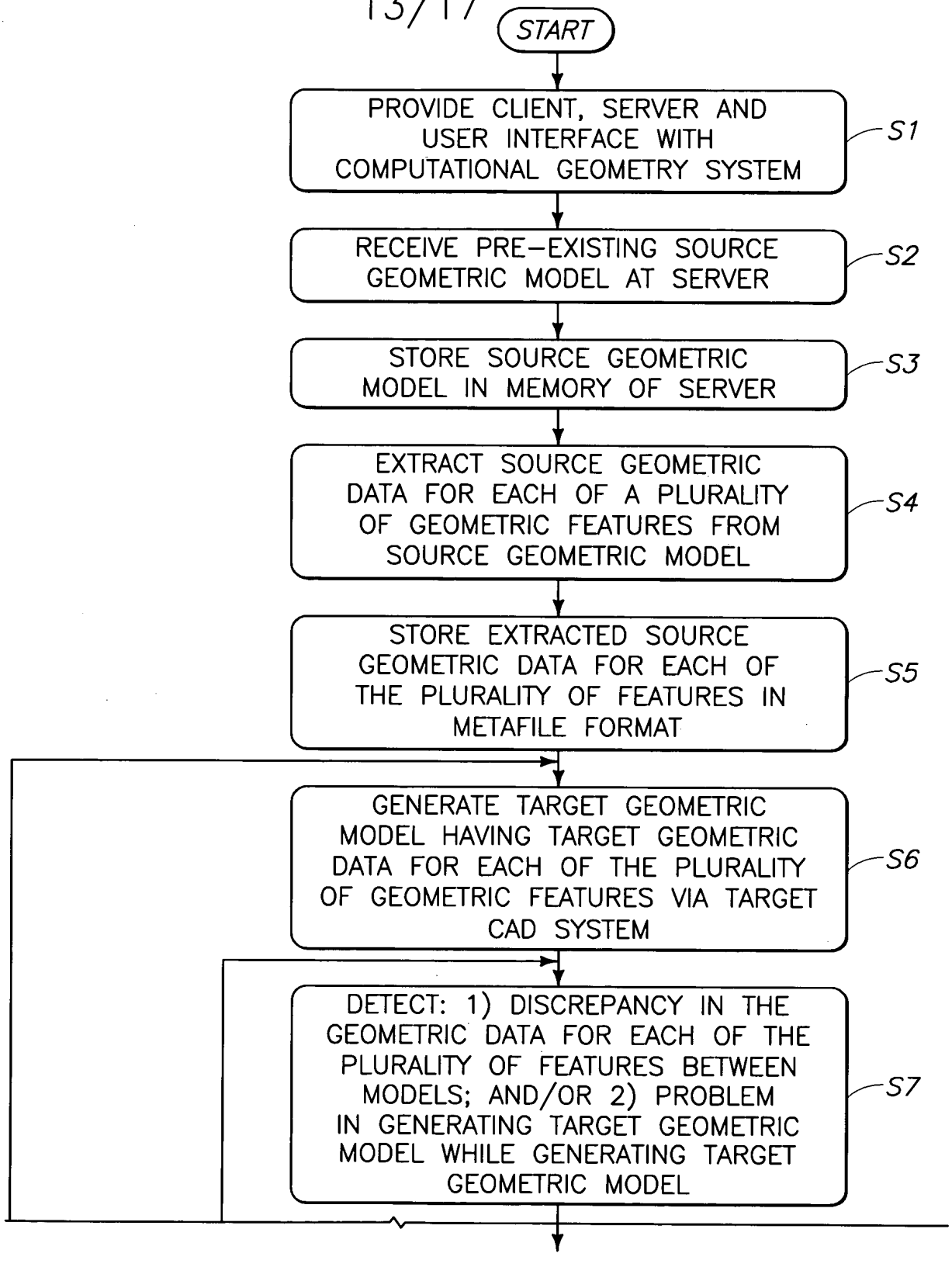

START
PROVIDE CLIENT, SERVER AND USER INTERFACE WITH COMPUTATIONAL GEOMETRY SYSTEM
S1
RECEIVE PRE-EXISTING SOURCE GEOMETRIC MODEL AT SERVER
S2
STORE SOURCE GEOMETRIC MODEL IN MEMORY OF SERVER
S3
EXTRACT SOURCE GEOMETRIC DATA FOR EACH OF A PLURALITY OF GEOMETRIC FEATURES FROM SOURCE GEOMETRIC MODEL
S4
STORE EXTRACTED SOURCE GEOMETRIC DATA FOR EACH OF THE PLURALITY OF FEATURES IN METAFILE FORMAT
S5
GENERATE TARGET GEOMETRIC MODEL HAVING TARGET GEOMETRIC DATA FOR EACH OF THE PLURALITY OF GEOMETRIC FEATURES VIA TARGET CAD SYSTEM
S6
DETECT: 1) DISCREPANCY IN THE GEOMETRIC DATA FOR EACH OF THE PLURALITY OF FEATURES BETWEEN MODELS; AND/OR 2) PROBLEM IN GENERATING TARGET GEOMETRIC MODEL WHILE GENERATING TARGET GEOMETRIC MODEL
S7
TO FIG 17B

Fig 17A

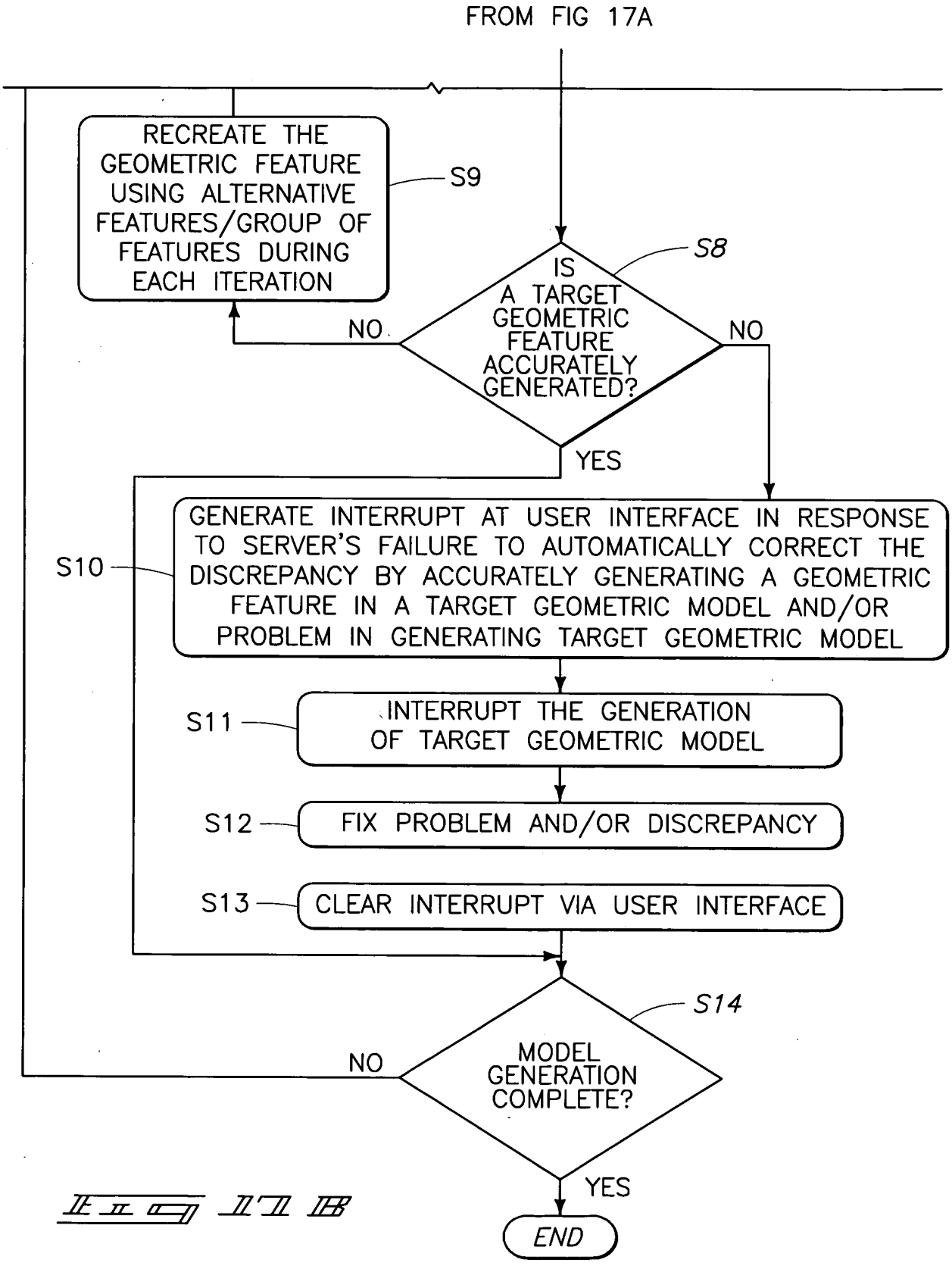

FROM FIG 17A
RECREATE THE GEOMETRIC FEATURE USING ALTERNATIVE FEATURES/GROUP OF FEATURES DURING EACH ITERATION
S9
S8
IS A TARGET GEOMETRIC FEATURE ACCURATELY GENERATED?
NO
NO
YES
S10
GENERATE INTERRUPT AT USER INTERFACE IN RESPONSE TO SERVER'S FAILURE TO AUTOMATICALLY CORRECT THE DISCREPANCY BY ACCURATELY GENERATING A GEOMETRIC FEATURE IN A TARGET GEOMETRIC MODEL AND/OR PROBLEM IN GENERATING TARGET GEOMETRIC MODEL
S11
INTERRUPT THE GENERATION OF TARGET GEOMETRIC MODEL
S12
FIX PROBLEM AND/OR DISCREPANCY
S13
CLEAR INTERRUPT VIA USER INTERFACE
S14
MODEL GENERATION COMPLETE?
NO
YES
END

Fig 17B

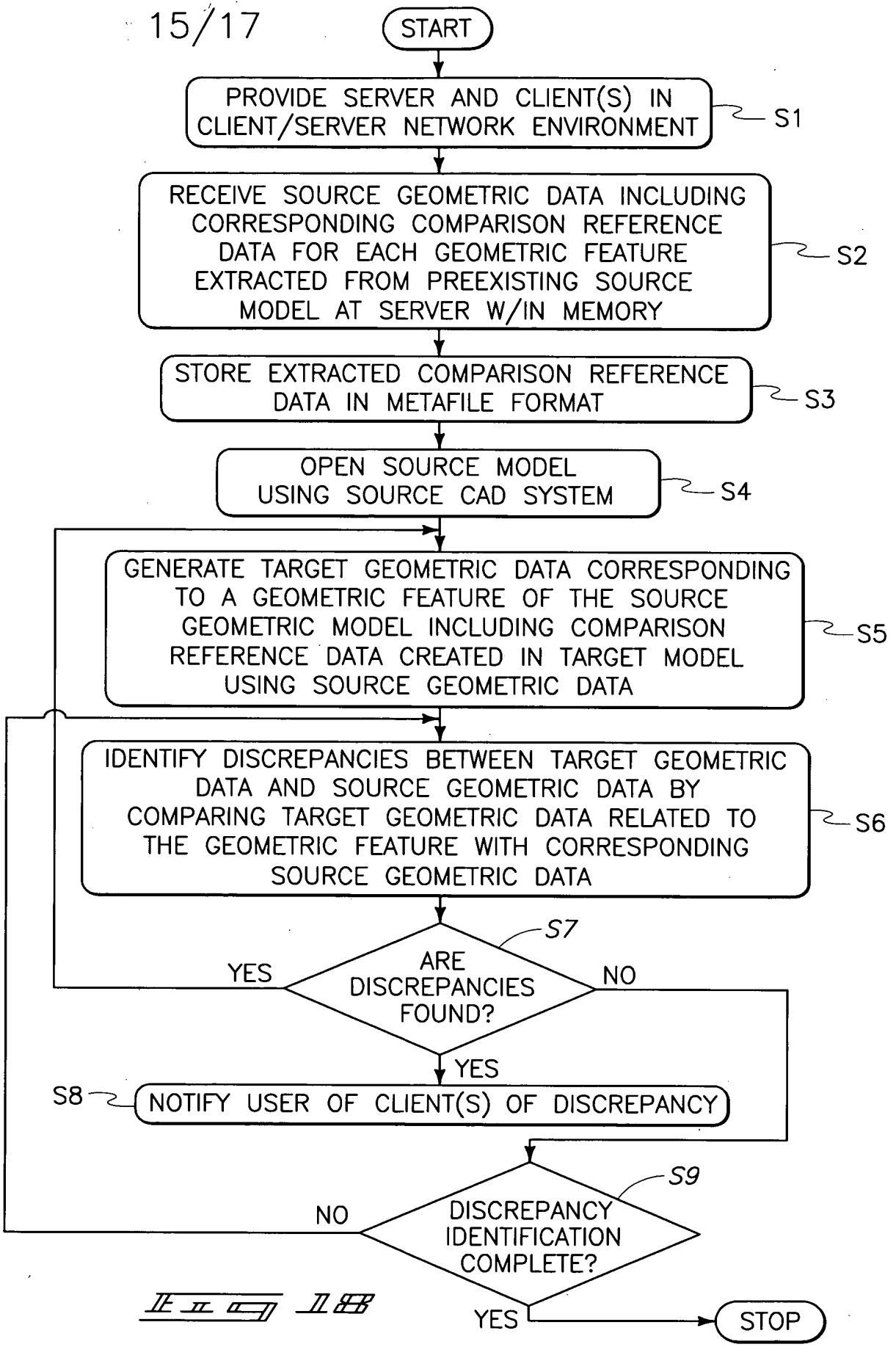

START
PROVIDE SERVER AND CLIENT(S) IN CLIENT/SERVER NETWORK ENVIRONMENT
S1
RECEIVE SOURCE GEOMETRIC DATA INCLUDING CORRESPONDING COMPARISON REFERENCE DATA FOR EACH GEOMETRIC FEATURE EXTRACTED FROM PREEXISTING SOURCE MODEL AT SERVER W/IN MEMORY
S2
STORE EXTRACTED COMPARISON REFERENCE DATA IN METAFILE FORMAT
S3
OPEN SOURCE MODEL USING SOURCE CAD SYSTEM
S4
GENERATE TARGET GEOMETRIC DATA CORRESPONDING TO A GEOMETRIC FEATURE OF THE SOURCE GEOMETRIC MODEL INCLUDING COMPARISON REFERENCE DATA CREATED IN TARGET MODEL USING SOURCE GEOMETRIC DATA
S5
IDENTIFY DISCREPANCIES BETWEEN TARGET GEOMETRIC DATA AND SOURCE GEOMETRIC DATA BY COMPARING TARGET GEOMETRIC DATA RELATED TO THE GEOMETRIC FEATURE WITH CORRESPONDING SOURCE GEOMETRIC DATA
S6
S7
ARE DISCREPANCIES FOUND?
YES
NO
YES
S8
NOTIFY USER OF CLIENT(S) OF DISCREPANCY
S9
DISCREPANCY IDENTIFICATION COMPLETE?
NO
YES
STOP

Fig 18

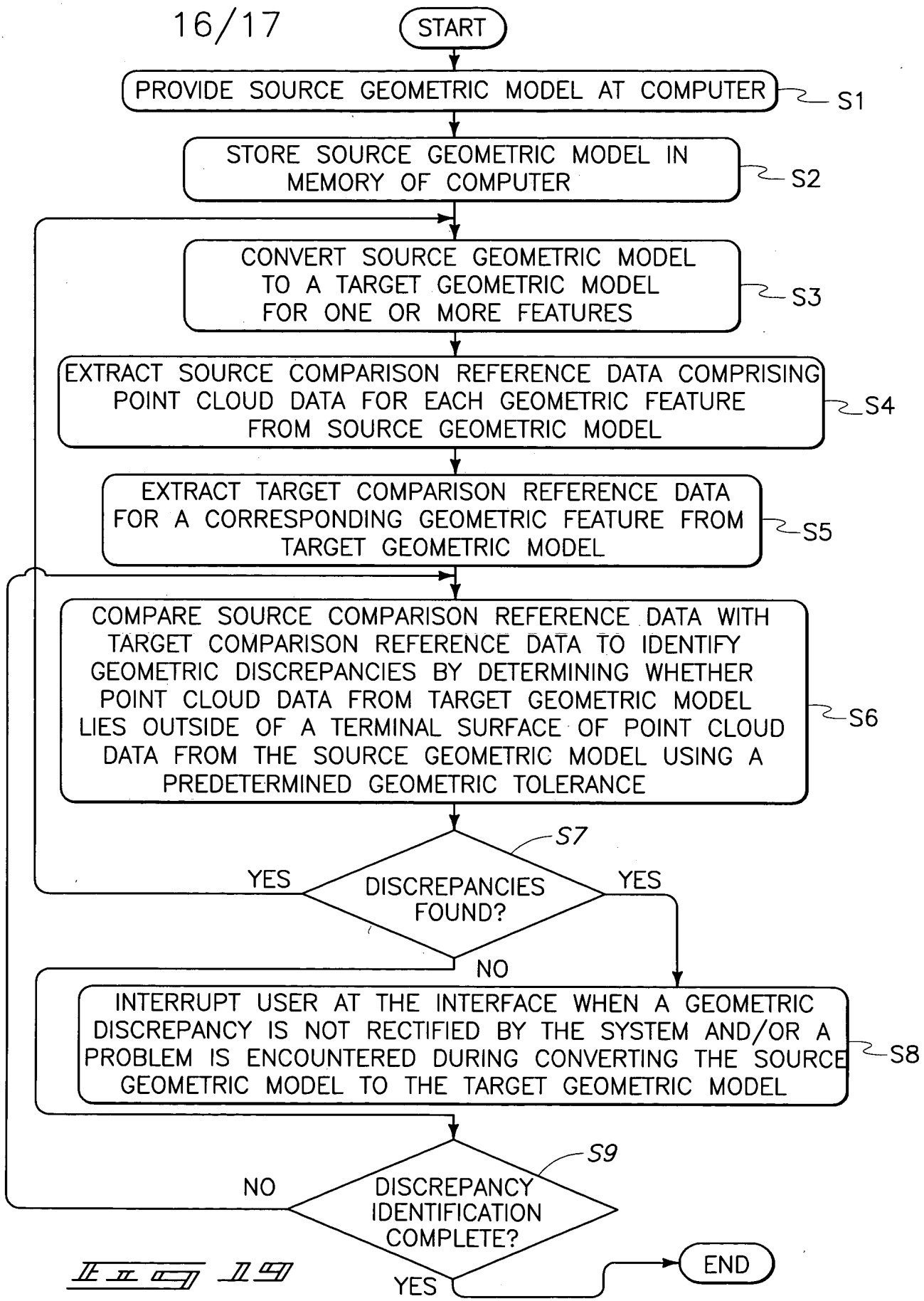

START
PROVIDE SOURCE GEOMETRIC MODEL AT COMPUTER
S1
STORE SOURCE GEOMETRIC MODEL IN MEMORY OF COMPUTER
S2
CONVERT SOURCE GEOMETRIC MODEL TO A TARGET GEOMETRIC MODEL FOR ONE OR MORE FEATURES
S3
EXTRACT SOURCE COMPARISON REFERENCE DATA COMPRISING POINT CLOUD DATA FOR EACH GEOMETRIC FEATURE FROM SOURCE GEOMETRIC MODEL
S4
EXTRACT TARGET COMPARISON REFERENCE DATA FOR A CORRESPONDING GEOMETRIC FEATURE FROM TARGET GEOMETRIC MODEL
S5
COMPARE SOURCE COMPARISON REFERENCE DATA WITH TARGET COMPARISON REFERENCE DATA TO IDENTIFY GEOMETRIC DISCREPANCIES BY DETERMINING WHETHER POINT CLOUD DATA FROM TARGET GEOMETRIC MODEL LIES OUTSIDE OF A TERMINAL SURFACE OF POINT CLOUD DATA FROM THE SOURCE GEOMETRIC MODEL USING A PREDETERMINED GEOMETRIC TOLERANCE
S6
S7
DISCREPANCIES FOUND?
YES
YES
NO
INTERRUPT USER AT THE INTERFACE WHEN A GEOMETRIC DISCREPANCY IS NOT RECTIFIED BY THE SYSTEM AND/OR A PROBLEM IS ENCOUNTERED DURING CONVERTING THE SOURCE GEOMETRIC MODEL TO THE TARGET GEOMETRIC MODEL
S8
S9
DISCREPANCY IDENTIFICATION COMPLETE?
NO
YES
END

Fig 19

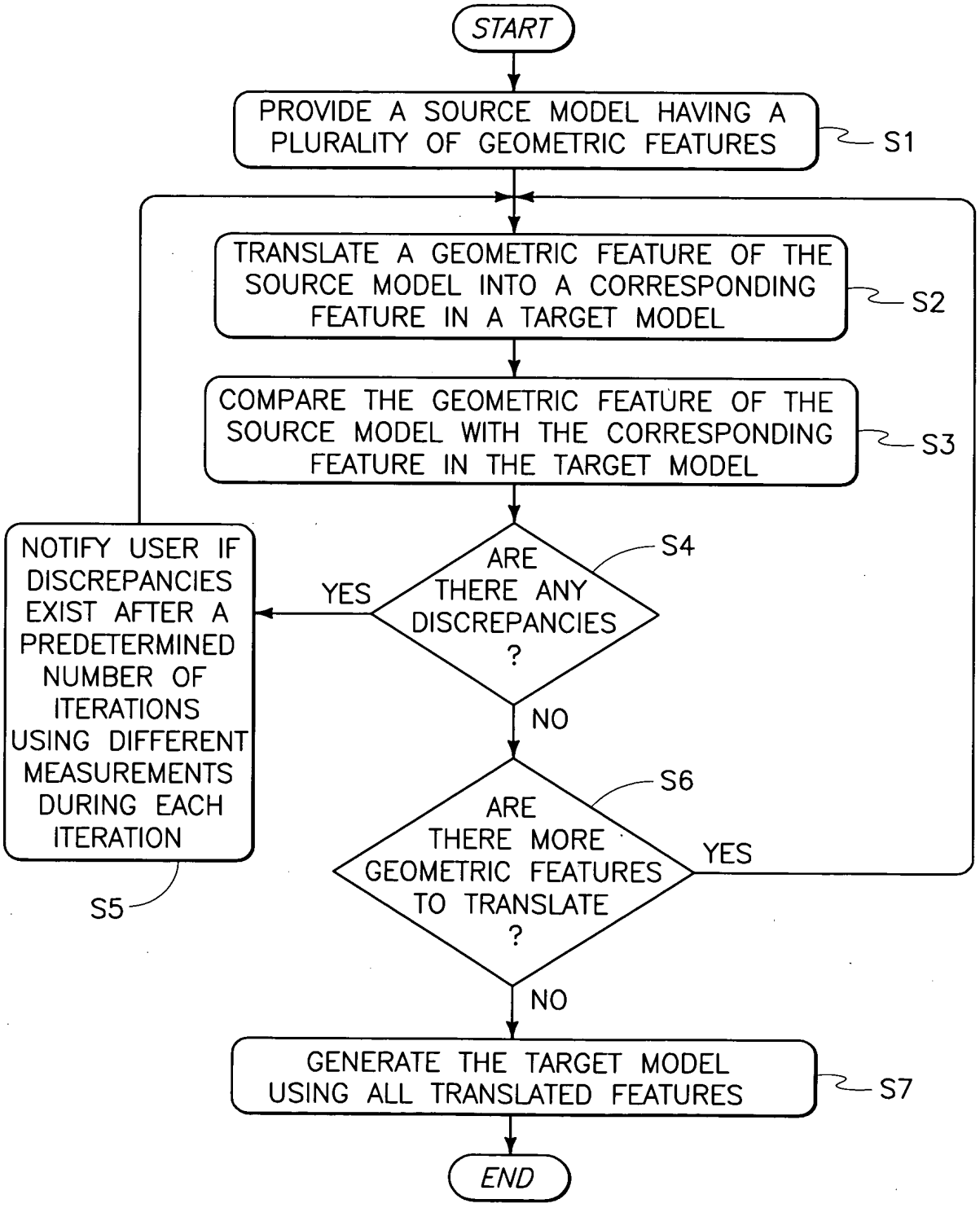

START
PROVIDE A SOURCE MODEL HAVING A PLURALITY OF GEOMETRIC FEATURES
S1
TRANSLATE A GEOMETRIC FEATURE OF THE SOURCE MODEL INTO A CORRESPONDING FEATURE IN A TARGET MODEL
S2
COMPARE THE GEOMETRIC FEATURE OF THE SOURCE MODEL WITH THE CORRESPONDING FEATURE IN THE TARGET MODEL
S3
ARE THERE ANY DISCREPANCIES ?
S4
YES
NO
NOTIFY USER IF DISCREPANCIES EXIST AFTER A PREDETERMINED NUMBER OF ITERATIONS USING DIFFERENT MEASUREMENTS DURING EACH ITERATION
S5
ARE THERE MORE GEOMETRIC FEATURES TO TRANSLATE ?
S6
YES
NO
GENERATE THE TARGET MODEL USING ALL TRANSLATED FEATURES
S7
END

Fig 20